City of Eureka Energy Committee
Proposed Electric Vehicle Charging Station Rollout Plan

July 2010

(Coulomb Technologies 2010)

(San Francisco Examiner 2010)

Prepared by:
The Eureka Energy Committee

For:

City of Eureka

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INTRODUCTION

The City of Eureka is taking a leadership role in establishing public electric vehicle (EV) charging infrastructure on California's North Coast. The City is initiating a multi-phase plan to roll out public EV charging stations throughout the City beginning in 2011.

Phase 1 of the City's plan involves installing six EV charging pedestals at the new, LEED Certified, Fisherman's terminal building, which is currently under construction.

Future Phases involve installing up to 40 additional EV charging stations in public parking lots around Eureka over the next two to three years.

The City is interested in exploring and promoting public/private partnerships with EV charging station and vehicle manufacturers as well as local early adopter organizations such as the Humboldt Electric Vehicle Association, to encourage widespread adoption of electric vehicles in the North Coast region.

The purpose of this brief document is to provide a preliminary summary of the City's plan, to be used for discussion purposes with interested stakeholders. The following topics are addressed herein:

- About the Eureka Energy Committee
- Practical Considerations for Electric Vehicle Transportation
- Phase 1 Project Concept
- Project Concept for Future Phases
- Desired Strategic Partnerships
- Project Timeline
- Summary

About the Eureka Energy Committee

The City of Eureka formed the Energy Committee in 2009. The committee's purpose is to recommend policy, propose and technically assist the city with projects that move the City of Eureka toward energy independence. The Committee is composed of local residents and energy professionals including Eureka's City Engineer Kurt Gierlich. For more information on the Eureka Energy Committee contact Chairman Michael Regan at michaelazaz@yahoo.com .

PRACTICAL CONSIDERATIONS FOR ELECTRIC VEHICLE TRANSPORTATION

The City is considering a number of practical considerations as part of the planning process for the installation of City-owned EV charging infrastructure. The commercial readiness of mass produced plug-in vehicles, EV charging station technologies and costs, incentive programs, public EV charging station revenue models, and how to accommodate existing electric vehicles converted by private vehicle owners, are all topics for consideration that are discussed in this section.

Commercial Readiness of Mass Produced Plug-In Vehicles

Pure electric vehicles and plug-in hybrid electric vehicles (plug-in vehicles) are often looked to as the next practical step to reducing the impacts of our current transportation energy consumption patterns. Recent developments in Lithium battery technology have led to renewed interest in the do-it-yourself (DIY) electric vehicle (EV) conversion enthusiasts and vehicle manufacturers alike. While there are no mass produced commercially available plug-in vehicles available at this time, there are some models that will become available in late 2010 and early 2011.

The Nissan Leaf and the Chevrolet Volt appear to be the only new, mass produced, plug-in cars that most members of the public can reasonably hope to acquire before the end of 2011. These cars are described in greater detail and compared to one and other in this section. There are a number of other electric cars worth of note as listed below:

- The plug-in Toyota Prius is rumored to become available in the near future, however no official information is available regarding release dates or pricing for this car. The local and regional dealers have no information on pricing or availability. It seems to be generally accepted that the car will have an all-electric range of only 12 to 14 miles, which is significantly less than the Nissan Leaf or Chevrolet Volt.

- Ford is reported to be offering an electric version of its Transit Connect utility vehicle to commercial fleet operators in 2010 and an all electric Ford Focus to the general public in 2011, however no further details are available at this time.

- Tesla Motors currently produces a relatively small number of high performance electric roadsters for a niche market and will have a 7 seat all electric sport sedan available for delivery in 2012. At $101,500 for roadster and $49,900 for the 7 sedan (after $7,500 tax credit) these cars are aimed at the performance and luxury markets.

Nissan Leaf

The Nissan Leaf is advertised as a five seat vehicle with a range of 100 miles. The car can be recharged in anywhere from 15 minutes to 8 hours depending on available charging current and voltage. Typical recharge times will be between 4 and 8 hours. Nissan began accepting reservation for the Leaf on April 20, 2010. Getting a car involves first reserving one for a cost of $99. The next step is to schedule a site assessment where an electrician makes a recommendation for the charging port. Next, Nissan's contractor, AeroVironment, installs the charging station. And finally the car is delivered. The first cars will be delivered in December 2010. Nissan USA is controlling the ordering of the cars to avoid dealers generating false orders to get inventory and then increasing the price to consumers as has happened in the past. The local Nissan dealer, McCrea Nissan is knowledgeable about the Leaf program and they do have trained technicians to perform maintenance and repairs.

Chevrolet Volt

The Chevrolet Volt is advertised as a four seat vehicle and has an all electric range of 40 miles. After the 40 mile electric range limit is reached, a gasoline powered generator comes on to keep the batteries at 30% state of charge and to provide power to the electric motor, allowing for extended range up to 300 miles in total. Official details regarding vehicle specifications, pricing and purchasing are not readily available, however it is scheduled to be released in October 2010.

Table 1 below summarizes the attributes of both cars.

Table1: Attributes of Nissan Leaf and Chevrolet Volt		
Attribute	**Nissan Leaf**	**Chevy Volt**
MSRP	$32,780	$40,000 (unofficial)
Federal Tax Credit	Up to $7,500	Up to $7,500
California Rebate	$5,000	$0
All-Electric Range (miles)	100	40
Gas/Electric Range	N/A	300 miles
Charging Station Cost	$2,200	Unknown
$/mile for 100 mile trip	$0.02	$0.05
Theoretical availability in 2010	Yes	Yes
Practical Availability in 2010	Challenging but well defined	Challenging and not well defined

EV Charging Station Technologies and Costs

The EV charging stations available on today's market range from very sophisticated models with credit card swipe technology and the ability to text vehicle owners when the charging cycle is complete, to basic units that simply plug into the vehicle and provide charging current. The pricing varies depending on features from $2,000 to $20,000 or more per station, not including site work and installation. Most models are weatherproof and there are a variety of systems used to prevent tampering.

Electric vehicle and charging station manufacturers have agreed on a standard charging plug, referred to as the SAE J1772 plug. The plug has finger safe, touch proof contacts, is designed for 10,000 insertions, and is rated for up to 80 amps at 208/240 volts. Vehicle charging socket modifications will be needed to enable the new standard plug to be used to charge vehicles produced by Tesla Motors or vehicles converted by private vehicle owners.

Incentive Programs

Due to the growing awareness of the environmental consequences of fossil fuel consumption, there have been a number of policies and regulations enacted recently aimed at improving energy efficiency across the country. Along with these policies and regulations come economic incentives designed to assist in the transition to a more energy efficiency economy. This section discusses some current programs that may help the City reach its EV charging infrastructure goals.

ChargePoint America
ChargePoint America is a $37M joint venture between EV charging station manufacturer Coulomb Technologies and Ford Motor Company. This program, funded by the American Recovery and Reinvestment Act through the Transportation Electrification Initiative administered by the Department of Energy, will establish a network of 5,000 free public and in-home charging stations to stimulate electric vehicle use across nine regions of the US. The applicability of this program for the City of Eureka is currently under investigation by the Energy Committee.

California Energy Commission Alternative and Renewable Fuel and Vehicle Technology Program (AB 118)
Assembly Bill 118 authorizes the California Energy Commission ***California Energy Commission Alternative and Renewable Fuel and Vehicle Technology Program (AB 118)***
The program has an annual budget of approximately $100M to support a variety of projects including the expansion of alternative fuel infrastructure, fueling stations, and equipment. The applicability of this program for the City of Eureka is currently under investigation by the Energy Committee.

US Department Of Energy, Energy Efficiency and Renewable Energy Clean Cities Program
Sponsored by the US Department of Energy (DOE) Vehicle technologies Program, Clean Cities is a government-industry partnership designed to reduce petroleum consumption in the transportation sector. Clean Cities can provide coalitions with access to information and incentives from DOE and other federal agencies, and industry partners. Currently the solicitations open under the program are not directly applicable to the City of Eureka's EV charging station infrastructure plan, however there may be opportunities through this program in the future.

Public EV Charging Station Revenue Models
The City recognizes the importance of supporting early EV adopters with incentives and it also must carefully consider the degree to which it can subsidize personal transportation costs during challenging economic times. Therefore, the City is investigating a revenue model consisting of a mix of free and fee based charging stations.

At the City Council's option, Phase 1 stations may initially be free to the public to promote and incentivize petroleum free transportation. Monitoring data would allow tracking of electricity costs and free stations could be converted to fee-based stations at any point in the future. The technology for credit card EV Charging Stations is currently being developed by several manufacturers and will likely be a viable option by the time Phase 1 is ready to be constructed next year.

For perspective, and eight hour charging cycle on the Nissan Leaf costs approximately $3.00, which yields approximately 100 miles of driving range. Assuming this is representative of the vehicles that will be utilizing the City's stations, and that one eight hour charge cycle per day

would be the daily duty cycle for one station, the maximum cost the City is likely to incur per station would be approximately $1,100 per year. This is a conservative estimate in that it is unlikely that a given station would be occupied 365 days per year.

For fee based stations, there are a number of methods available to the City for collecting revenue from the stations. The simplest systems have a phone number that users can call to initiate a charging event. More sophisticated systems are credit card based. Some systems offer multiple payment methods and can be configured to adjust rate by time of day, by calendar, or by driver, allowing the City flexibility for discounting rates during off peak times or free access for City fleet vehicles.

The Energy Committee is requesting information from charging station manufactures for the purpose of determining the apparent best technology selection for both free and fee based stations.

Accommodating Existing Plug-In Vehicles Converted by Private Vehicle Owners

The North Coast region is home to the Humboldt Electric Vehicle Association (HEVA), which has been a focal point for electric vehicle enthusiasts in Humboldt County for many years. The City is requesting feedback from HEVA on its plans to install EV charging infrastructure in Eureka. Specifically, the City is interested in steps that can be taken to make the new charging stations accessible and convenient for owners of private EV conversions.

Phase 1 Project Concept

The City plans to roll out EV charging infrastructure in multiple phases. In Phase 1, six EV charging stations will be installed at the new, LEED Certified Fisherman's Terminal Building that is currently under construction on the Eureka Boardwalk. These stations will be installed in late 2010 or early 2011 and they are proposed to be free to the public to promote and incentivize petroleum free transportation. Figure 1 below shows a rendering of the Phase 1 concept.

Phase 1 will act as a pilot project with charging stations from multiple manufacturers being installed to test performance and suitability for future phases, when a network of charging stations is proposed to be installed at strategic locations throughout Eureka. Future phases are described below.

Project Concept for Future Phases

Future phases of the City's project involve installing a network of approximately 40 additional charging stations at strategic locations throughout the City. Figure 2 below shows the preliminary locations for these additional stations.

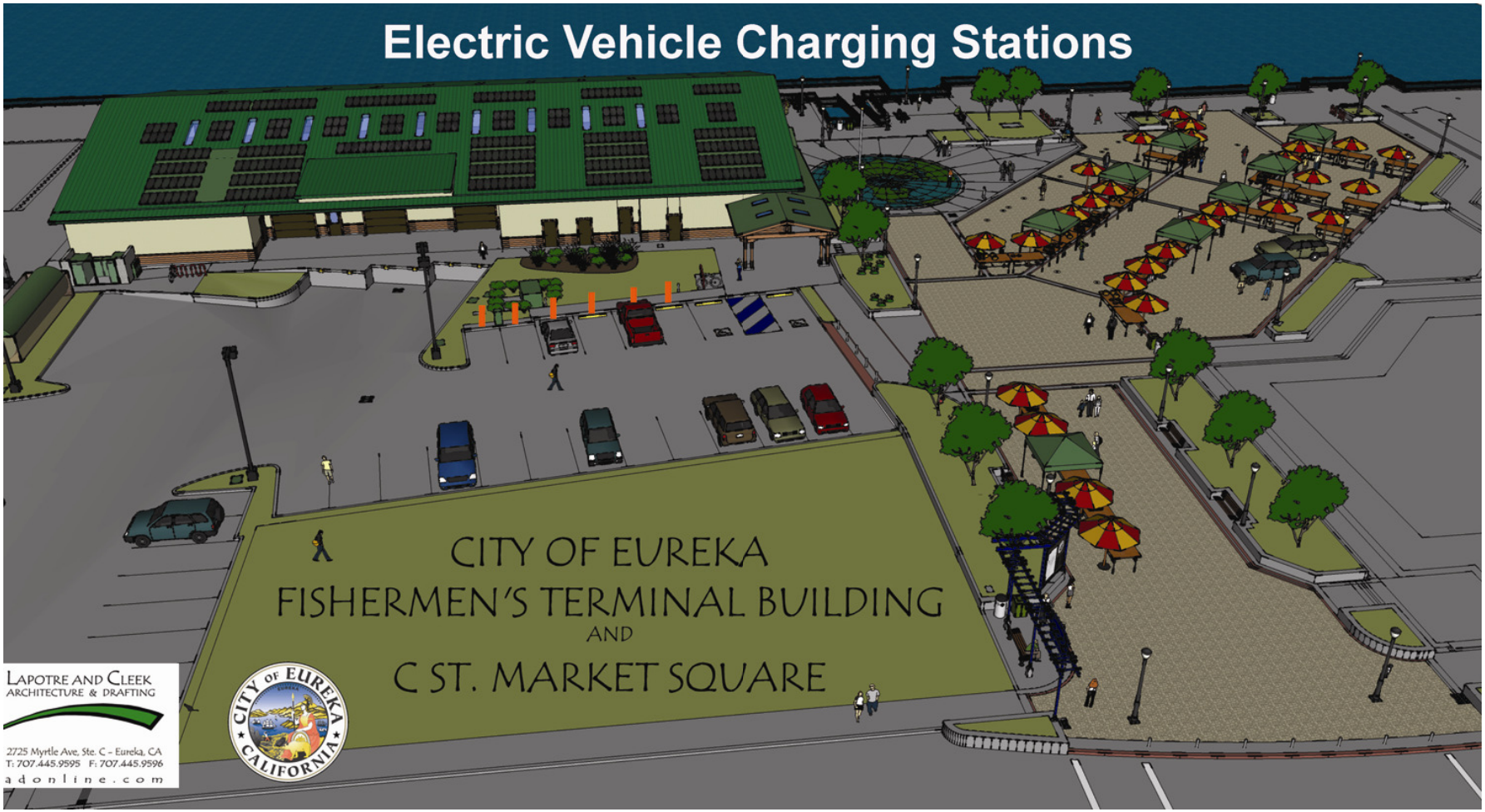
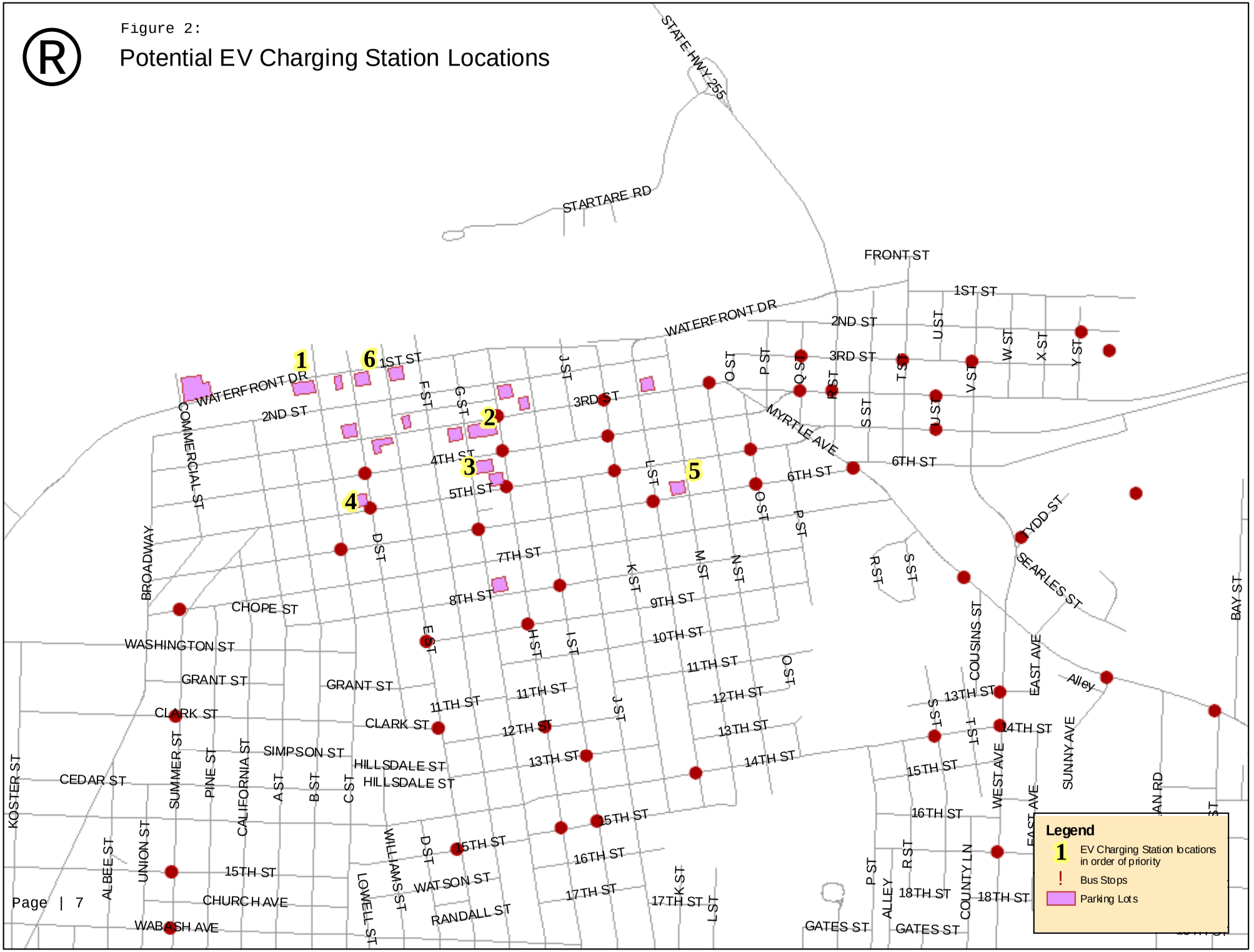


Figure 1: Architectural Rendering Showing Phase 1 Electric Vehicle Charging Stations in Orange

Figure 2:

Potential EV Charging Station Locations



The experience gained from Phase 1 of the project will guide the vendor selection for future phases of the project. The stations installed during future phases will likely be fee based stations to cover operational costs such as the electricity consumed and ongoing maintenance costs.

Desired Strategic Partnerships

The City is seeking strategic partnerships with EV charging station manufacturers, auto manufacturers and dealers, and state and federal government entities interested in promoting public EV charging station networks. A partial list of entities that the City is interested in partnering with is as follows:

- Government Entities
  - North Coast Unified Air Quality District
  - US Department of Energy
  - California Energy Commission
  - Other Local Jurisdictions
- Charging Station Manufacturers
  - Coulomb Technology
  - Clipper Creek
  - eTec
  - AeroVironment
  - Electric Vehicle Infrastructure
  - Evoasis USA
- Local Auto Dealers
  - McCrea Nissan
  - Northwood Chevrolet
  - Mid City Motorworld (Ford, Toyota, and Honda)
- Community Organizations
  - Humboldt Electric Vehicle Association
  - Greenwheels

Project Timeline

Phase 1 of the City's project is anticipated to be operational by June 2011. The timeline for future phases is dependent on a number of factors including the utilization of Phase 1 stations, strategic partnership development activities, and availability of funds. The City's goal is to initiate future phases of the project after one full year of operational data is collected from Phase 1.

Summary

The City of Eureka is implementing a multi-phase plan to install EV charging infrastructure throughout the City. Strategic Partnerships are being sought with EV and charging station manufacturers, local auto dealers, community organizations, and State and Federal entities to participate in the project.

Pre-project planning activities are being led by the City of Eureka Energy Committee, a group of appointed residents with a collective set of skills appropriate for providing guidance to the City Council on energy related matters. Interested parties are requested to contact the Eureka Energy Committee Chair Michael Reagan at michaelazaz@yahoo.com or City Engineer Kurt Gierlich at kgierlich@ci.eureka.ca.gov .